FORM PTO-1390 (REV. 11-2000)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371	ATTORNEY'S DOCKET NUMBER 4726-000003 U.S APPLICATION NO (If known, see 37 CFR 1 5 **09/914225**

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/AU00/00121	22 February 2000 (22.02.00)	22 February 1999 (22.02.99)

TITLE OF INVENTION	INTEGRATED POINT-OF-SALE AND INTERNET MULTI-APPLICATION SYSTEM AND METHOD OF USE THEREOF

APPLICANT(S) FOR DO/EO/US MAC.SMITH, David L.; GARTON, Benjamin A. and WESCOMBE, Justin C. A.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.

3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.

4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).

5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
    a. ☐ is attached hereto (required only if not communicated by the International Bureau).
    b. ☒ has been communicated by the International Bureau.
    c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).

6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
    a. ☐ is attached hereto.
    b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).

7. ☒ Amendments to the claims of the International Aplication under PCT Article 19 (35 U.S.C. 371(c)(3))
    a. ☐ are attached hereto (required only if not communicated by the International Bureau).
    b. ☐ have been communicated by the International Bureau.
    c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
    d. ☒ have not been made and will not be made.

8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).

9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).

10. ☐ An English lanugage translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.

12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

13. ☒ A FIRST preliminary amendment.

14. ☐ A SECOND or SUBSEQUENT preliminary amendment.

15. ☐ A substitute specification.

16. ☐ A change of power of attorney and/or address letter.

17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.

18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).

19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).

20. ☒ Other items or information:
PTO Form 1449 with copy of International Search Report and return postcard.

U S APPLICATION NO. (if known, see 37 CFR. 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
09/791422 5	PCT/AU00/00121	4726-000003

	CALCULATIONS PTO USE ONLY
21. ⊠ The following fees are submitted: **BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):** Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. . . . . **$1000.00** International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO . . . . **$860.00** International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO . . . . **$710.00** International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) . . . . **$690.00** International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**	

ENTER APPROPRIATE BASIC FEE AMOUNT =				$ 1,000.00
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ⊠ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				$ 130.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	$
Total claims	10 - 20 =	0	x **$18.00**	$ 0.00
Independent claims	2 - 3 =	0	x **$80.00**	$ 0.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ **$270.00**	$ 0.00

TOTAL OF ABOVE CALCULATIONS =		$ 1,130.00
⊠ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.	+	$ 565.00
SUBTOTAL =		$ 565.00
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).		$ 0.00
TOTAL NATIONAL FEE =		$ 565.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +		$ 0.00
TOTAL FEES ENCLOSED =		$ 565.00

Amount to be refunded:	$
charged:	$

a. ⊠ A check in the amount of $ 565.00   to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.

c. ⊠ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 08-0750___ . A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card
information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR
1.137 (a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO:

Gordon K. Harris, Jr.
Harness, Dickey & Pierce, P.L.C.
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Bloomfield Hills, Michigan 48303
United States of America

SIGNATURE

Gordon K. Harris, Jr.
NAME

28,615
REGISTRATION NUMBER

Dated: August 21, 2001

21. [X] The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):

	CALCULATIONS PTO USE ONLY

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1000.00**

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$860.00**

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$710.00**

International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$690.00**

International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**

ENTER APPROPRIATE BASIC FEE AMOUNT =				$ 1,000.00
Surcharge of $130.00 for furnishing the oath or declaration later than [ ] 20 [X] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				$ 130.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	$
Total claims	10 - 20 =	0	x $18.00	$ 0.00
Independent claims	2 - 3 =	0	x $80.00	$ 0.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $270.00	$ 0.00

TOTAL OF ABOVE CALCULATIONS =		$ 1,130.00
[X] Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.	+	$ 565.00
SUBTOTAL =		$ 565.00
Processing fee of $130.00 for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).		$ 0.00
TOTAL NATIONAL FEE =		$ 565.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +		$ 0.00
TOTAL FEES ENCLOSED =		$ 565.00

Amount to be refunded:	$
charged:	$

a. [X] A check in the amount of $ 565.00 to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 08-0750 . A duplicate copy of this sheet is enclosed.

d. [ ] Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

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United States of America

SIGNATURE

Gordon K. Harris, Jr.
NAME

28,615
REGISTRATION NUMBER

Dated: August 21, 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. (not yet assigned)

Filing Date: (not yet assigned)

Applicant: DAVID L. MAC.SMITH, *et al.*

Group Art Unit: (not yet assigned)

Examiner: (not yet assigned)

Title: INTEGRATED POINT-OF-SALE AND INTERNET
                    MULTI-APPLICATION SYSTEM AND METHOD OF USE THEREOF

Attorney Docket No. 4726-000003

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents
and Trademarks
Washington, D. C. 20231

Sir:

               Prior to substantive examination of the captioned National Phase Entry, please

amend the application, as follows:

IN THE CLAIMS

               Please cancel claims 11 and 12.

               Please amend claims 3, 6 and 10 as set forth in the following clean version of

said claims. Submitted herewith is an Attachment for Claim Amendments setting forth additions

underlined and deletions in square brackets.

               3.   (Amended) A system for manipulating data on a plurality of data carrying

devices according to claim 1 wherein terminal software is installed upon said internet server,

said terminal software being activatable and configurable in response to parameter files sent

from the host.

6. (Amended) A system for manipulating data on a plurality of data carrying devices according to claim 1 wherein the data carrying devices include an electronic signature which can be used to verify the identity of a device owner.

10. (Amended) A method for manipulating data on a plurality of data carrying devices according to claim 7, further including the step of:

accessing an electronic signature from the data carrying device prior to performing step d) so as to verify the identify of a device owner.

By this Amendment, multiple dependent claims and omnibus claims present in the parent PCT case have been eliminated.

The claims as amended are believed to be in condition for allowance.

Respectfully submitted,

Date *August 21, 2001*

By _____

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GKH/al
Att.

3.   (Amended) A [method] <u>system</u> for manipulating data on a plurality of data carrying devices according to claim 1 [or 2] wherein terminal software is installed upon said internet server, said terminal software being activatable and configurable in response to parameter files sent from the host.

6.   (Amended) A system for manipulating data on a plurality of data carrying devices according to [any one of the above claims] <u>claim 1</u> wherein the data carrying devices include an electronic signature which can be used to verify the identity of a device owner.

10.   (Amended) A method for manipulating data on a plurality of data carrying devices according to [any one of claims] <u>claim</u> 7 [to 9], further including the step of:

accessing an electronic signature from the data carrying device prior to performing step d) so as to verify the identify of a device owner.

TITLE: INTEGRATED POINT-OF-SALE AND INTERNET MULTI-APPLICATION

SYSTEM AND METHOD OF USE THEREOF

FIELD OF THE INVENTION

5   The present invention relates to a Integrated Point-of-Sale (POS) and Internet

Multi-Application System and Method of use thereof.

The invention is an improvement which adds further functionality to the system

described in co-pending Australian provisional application No. PP2740 and PCT

application No. PCT/AU98/01009, the contents of which are hereby incorporated in their

10   entirety by reference.

The invention has been developed primarily for use as a smart-card system and

will be described hereinafter with reference to this application. However, it will be

appreciated that the invention is not limited to this particular field of use.

BACKGROUND

15   Known smart-card implementations generally configure the card differently

depending upon the particular functions they are to perform. Typically, the memory

space of prior art smart-card systems contain various segments of fixed size, each of

which are dedicated to the storage of a particular kind of data relating to a specific

application/programme. Such utilisation of the limited resources generally available in a

20   smart-card results in limited overall functionality. For example, in the prior art, a 1K

card typically supports 1, 2 or 3 predetermined and fixed applications/programmes.

It is known to format data on smart-cards such that each application resides in a

separate directory, for example in accordance with International standard ISO 7816.

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In practice however, it has been appreciated by the applicant that these formats are not suited for devices such as smart-cards if they are configured to support large numbers of applications and programmes because the amount of resources required to support the resulting elaborate application and directory structure is excessive.

5   Additionally, the differing formats adopted by different card providers for different applications or programmes seriously limits the inter-operability of present day smart-card systems. In other words, a smart-card supplied by a given card provider or card issuer for a particular programme and configured to fulfil a particular function, will generally not be compatible with the hardware and operating systems of different card

10   providers, or hardware and operating systems designed to fulfil a different function, or the potential limitless number of different programmes or functions required by the many different card providers, card issuers or users of the different functions and programmes.

Known smart-card systems are typically custom made to support a small number

15   of specific applications running under fixed constraints. Changes to the system usually require revision of the software and possibly the associated hardware, involving long lead times and substantial expense. The low number of applications/ programmes supported by each card and the lack of flexibility inherent in the current approach has seriously limited the functionality and interoperability of present day smart-card

20   technology.

Further, known techniques for purchasing goods and services over the internet do not integrate seamlessly with the standard point of sale (POS) techniques. For example, in some circumstances, a trader may wish to provide a loyalty incentive program

whereby the consumer is rewarded for a purchase of goods or services with, say, a discount on the next similar purchase. However, due to the lack of integration between the prior art techniques of internet commerce and POS commerce, there is a risk that a consumer who should receive a loyalty reward due to a purchase on a first medium, for

5   example, the internet, will not automatically be credited with a loyalty reward when subsequently purchasing on a second medium, such as a POS terminal. It has been appreciated by the inventors of the present application that this failure often derives from the substantial lag time associated with reconciling the separate records of internet sales with the records of POS sales. This problem may be particularly acute when different

10 merchants attempt cross-promotional exercises wherein a sale by a first merchant is rewarded by a second, separate merchant.

It is an object of the present invention to overcome or ameliorate one or more of the disadvantages of the prior art, or at least to provide a useful alternative.

Due at least partially to the problems associated with integrating internet transactions and POS transactions, merchants have generally tended to trade either over the internet exclusively, or via POS transactions exclusively.

15 **SUMMARY OF THE INVENTION**

It is an object of the present invention to overcome or ameliorate one or more of the disadvantages of the prior art, or at least to provide a useful alternative.

According to one aspect of the invention, there is provided a system for manipulating data on a plurality of data carrying devices, said system including at least

20 one host and a plurality of terminals, each terminal being adapted to interact with said data carrying devices and to communicate with said host, wherein a first sub-set of said terminals are point of sale terminals and a second sub-set of said terminals are computing means capable of interfacing to the internet for communication with an

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internet server which, in turn, is connected for communication with said host, said computing means being adapted to read from, and write to, said data carrying devices.

In this arrangement, the computing means and the internet server together perform an analogous function to that of the POS terminal. In other words, the computing means and internet server coexist in parallel with the POS terminals.

In one preferred embodiment, the computing means are in the form of any combination of the following: personal computers; personal digital assistants such as palmtop and handheld computers; mobile phones; or electronic information kiosks.

According to another aspect of the invention there is provided a method for manipulating data on a data carrying device which includes combinations of any one or more programs for the following applications: an electronic purse or other payment system; loyalty; electronic tickets; memberships; and/or access control, said method including the steps of:

a)   inserting a data carrying device into a computing means adapted to read from, and write to, said data carrying devices, said computing means being adapted to interface to the internet for communication with an internet server which, in turn, is connected for communication with a host;

b)   using said computing means to establish a connection with a merchant internet site;

c)   if transaction enabling software is not already stored on the computing means, downloading said software across the internet;

d)   using said computing means to select a good or service offered by said merchant; and

e)   using said computing means to write updated data to at least one of said programs as appropriate for said transaction.

Preferably the computing means communicates with an internet server upon which is stored terminal software which is activatable and configurable in response to parameter files sent from the host.

Preferably, step e) in the above method, when used with data carrying devices having loyalty programs, includes the following sub-steps:

e1)   using said terminal software installed upon said internet server to check whether a loyalty reward is due in return for purchase of said good or service;

e2)   updating loyalty data in a loyalty programme on said data carrying device if a loyalty reward is due.

Additional, or alternative, preferable sub-steps for step e) in the above method, when used with data carrying devices having an electronic pursue or other payment system program, are as follows:

e3) using said terminal software installed upon said internet server to check whether the payment system program has an amount of electronic representation of money required for the transaction; and

e4) deducting the required amount of electronic representation of money from the payment system program.

As used in this document, the term "data carrying device" includes chip bearing devices such as contact smart-cards, contactless smart-cards, dual interface (combi) smart-cards, watches, rings, key rings, implants, keys, mobile phones, personal data

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assistants (PDA's) and "virtual" storage devices such as electronic wallets, online databases, internet cookies and the like.

The preferred embodiment of the present invention allows numerous different applications to be implemented many times over. For example, any one data carrying 5 device may, at any time, hold numerous different tickets for various unrelated services. Each implementation of an application is referred to in this document as a "programme".

The ability of the preferred embodiment of the present invention to integrate internet trade with standard point of sale commerce via common loyalty and other applications, compares favourably to the prior art.

10 **BRIEF DESCRIPTION OF THE DRAWINGS**

A preferred embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a schematic view of a memory space;

Figure 2 is another schematic representation of a memory space showing a 15 preferred relationship between the index area and the application area;

Figure 3 is a schematic diagram of a system;

Figure 4 is a schematic diagram of software included in at least some of the terminals;

Figure 5 is a schematic diagram of a first embodiment of a system according to the 20 present invention; and

Figure 6 is a schematic diagram of a second embodiment of a system according to the present invention.

PREFERRED EMBODIMENTS OF THE INVENTION

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Referring to the drawings. the data carrying device (not shown) has a memory space 1 for storing data at a plurality of locations. said memory space including:

a static area 2 residing at a fixed location;

an index area 3 residing at a first dynamically allocatable location; and

5   an application area 4 residing at a second dynamically allocatable location.

The first and second dynamically allocatable locations allow the index area and application area to be defined within any portion of the memory space. Advantageously, this provides a security safeguard because memory spaces on different devices can be formatted differently such that a location corresponding to a given type of information

10   on a first memory space will not necessarily correspond to a location of similar data in a second memory space. Additionally, the flexibility inherent in providing dynamically allocatable locations enables different data carrying devices, having different amounts, configurations and available regions of memory space, to operate efficiently within the one system. For example, the preferred embodiment allows for memory space to be

15   reserved in a standard format on the majority of the popular, presently available smart-cards, despite differing memory capacities and memory location formats. In particular, the memory space can co-exist on and with numerous pre-existing third-party smart-card systems and pre-existing payment systems, such as Visa Cash, Mondex, Chipper, debit, credit and cash, provided sufficient spare memory space is available on a smart-card. In

20   other words, any device formatted in the above described manner can be used in any of the terminals of the preferred embodiment (unless such use is specifically prohibited by a rule defined by a parameter file).

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As shown in figure 2, the application area 4 is divided into a plurality of units 5, each being configurable to store data associated with part, or all of, a programme. The location of any unit, or units corresponding to any programme is dynamically allocatable. The size of a unit 5 is small compared to the size of the segments utilised in

5   the prior art. For example, a prior art segment (which holds data corresponding to one application/programme only) may have a pre-defined size of, say, 500 bytes. However, if the actual memory space used by the application/programme is less than this fixed amount, say, 100 bytes, this arrangement results in significant wasted resources, in this example 400 bytes.

10   In contrast, the size of the units used in the preferred embodiment of the present invention is 16 bytes. Once a programme (ie the data relating to an application) has been written to the minimum number of units required, the next blank unit is then available for the writing of another programme because the location of any unit corresponding to any programme is dynamically allocatable. Hence, the amount of wasted resources lying

15   between consecutive programme data can be arranged to never exceed 15 bytes. Therefore the present invention allows multiple programmes to be written to the application area in a far more memory space efficient manner by minimising wasted resources between programmes.

Additionally, because the programmes all reside within the application area of the

20   present invention, the wasted resources associated with creating a separate directory for each application/programme are avoided.

The present invention advantageously allows the application area 4 to be utilised by the system of the preferred embodiment on an "as required" basis. For example, if

only one application is being run on a particular data carrying device, for example
ticketing, then substantially the whole of the application area is available for storage of
data relating to ticketing programmes. This compares favourably to the prior art where
predefined segments of memory space, having a fixed size, are provided for each
5   application supported by the prior art system. Hence, memory space is allocated
regardless of whether it is required by a particular data carrying device.

The static area 2 is configured to include data indicative of any of the following:

an entity responsible for issuing the data carrying device;

an issuing country;

10   a card group;

a unique device identification number;

whether the device is personalised;

a date and time at which the device was initialised;

the location of said application area;

15   a size of said application area;

a device model; and/or

an entity responsible for initialising the data carrying device.

The data indicative of whether the device is personalised may be used, for
example, in smart-cards, to indicate whether the name of the card holder is embossed
20   thereon.

The static area 2 is configurable as either random access memory, or read only
memory, by means of setting access control rules, for example an access control block
(not shown). In the preferred embodiment, the static area 2 is configured as random

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access memory prior to an initialisation process whereby the above data is written to the static area. After the initialisation process, the static area is configured as read only memory so as to prevent inadvertent or unauthorised changes to the data.

The provision of the data in the static area 2 enables the allocation of memory
5   space 1 on a data carrying device to be individually tailored for each device at the time of initialisation. This enables far greater flexibility than the prior art systems which require allocation of space to be fixed for the effective lifetime of the system. Hence, the present invention allows the values in the static area 2 to be changed for each newly initialised device so as to readily allow for the development of new products having
10   different space requirements and yet still operating within the same system.

The location of the static area 2 is fixed as it effectively controls access to all other areas on the data carrying device. In the preferred embodiment, the static area is placed in the first available memory location of the device.

The index area 3 is configured to hold a plurality of index entries 6 representing
15   numbers, each of which uniquely correlate with applications residing within the application area 4 according to a predetermined correlation scheme. In the scheme of the preferred embodiment, the number may range between 0 and 65535. For example, 00100 corresponds to an application holding device variables. Numbers in the range of 10,000 to 19,999 are reserved for loyalty program applications. The range 20,000 to
20   29,999 is reserved for pass applications such as membership, access control and tickets. 30,000 to 39,999 is reserved for electronic purse applications and 40,000 to 49,999 for account applications.

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As will be appreciated by those skilled in the art, the correlation scheme can be tailored so as to uniquely match any number with a specific application. In some embodiments, an order of location of the index entry numbers 6 corresponds respectively with an order of location of the applications.

5   In the preferred embodiment, the application area is segmented into units 5 and the index area 3 is configured to hold a plurality of index entries 6 representing numbers, each of which uniquely correlate with the programmes written onto the units according to the predetermined correlation scheme. In this embodiment, an order of location of said numbers corresponds respectively with an order of location of said units 5. This

10   relationship is shown in figure 2 whereby index area entry n defines the contents of the application and programme in the corresponding application unit n.

Each index entry is initially set to zero during the initialisation process so as to indicate that no programmes have yet been stored in the application area. As programmes are subsequently written to the application area, the index entries are

15   correspondingly updated.

If necessary, some of the programmes may expire once predetermined expiry criteria are fulfilled. For example, an programme may expire once a certain date is reached or once a certain number of transactions have been completed. The units 5 occupied by an expired programme are available for the writing of a replacement

20   programme. Similarly, the index entries 6 corresponding to said expired units 5 are available for the writing of replacement index entries 6 corresponding to said replacement programme. In a preferred embodiment, the units 5 occupied by an expired programme are only available for the writing of the replacement programme if all index

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entries 6 indicative of the programmes in the units 5 are non-zero. This ensures that all free units 5 are utilised before data in an expired unit is over-written.

As shown in Figure 3, a preferred embodiment of a system 30 for manipulating data on a plurality of data carrying devices 31, preferably smart-cards 32, includes at
5   least one host 33 and one or a plurality of terminals 34, each being adapted to interact with said data carrying devices 31. In particular, the terminals 34 are adapted to read from the static area 2, index area 3 and application area 4 of each data carrying device 31 and to write to the index areas 3 and the application areas 4.

The terminals 34 and the host 33 are adapted to communicate parameter files (not
10   shown) therebetween. Such communication may be by means of an on-line connection between the host 33 and each of the terminals 34. Some alternative embodiments of the invention accomplish communication between the host 33 and the terminals 34 by means of a portable data carrying device (not shown). The latter form of communication is especially suited for terminals 34 located in remote areas where on-line connection
15   may not be feasible, or for example, in an automated vending machine for which the establishment of an on-line connection would not be financially viable.

In another preferred embodiment (not illustrated) the terminal software runs at an internet web server as a "virtual terminal" which processes transactions performed at the merchant web site. This virtual terminal communicates to the host in the same manner
20   as the real-world terminals.

At least some of the terminals 34 include functionally identical software 40 (labelled "Application Support Logic" in figure 4) being activatable and configurable in response to said parameter files so as to initiate and/or update data on said data carrying

devices 31. In this document, the scope of the term "functionally identical" includes software comprising or formed from differing source codes but achieving similar or preferably identical overall functionality.

The use in terminals 34 of software being activatable and configurable in

5   response to parameter files sent from a host 33 enables the system 30 of the preferred embodiment to offer a far greater range of functions than has hitherto been available in smart-card systems. Depending upon the number of applications and programmes supported by the system, and the number of ways in which each application can be implemented to form a programme, the system can be configured to run thousands of

10   programmes relating to large numbers of applications. For example, the preferred embodiment can be configured to support from less than 5 to 50 or more different applications, each of which can result in a large number of different programmes, the exact details of which will vary depending upon the contents of the parameter files communicated between the terminals and the host. Hence the system of the present

15   invention provides for a huge range of options. For example the preferred embodiment provides capability for over 36 different concurrent programmes running on one data carrying device having a memory storage capacity of 1K. Additionally, over 65,000 different concurrent programmes can be supported by one host.

The amount of data communicated in the parameter files is comparatively small

20   in relation to the size of the software 40 required to provide the various applications and programmes implemented by smart-cards. Hence, limiting communication predominantly to parameter files helps to minimise the time, resources and expense associated with communications between the terminals 34 and the host 33.

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The host 33 is configured to receive and store the data sent from all terminals 34 so that a central record of all interactions between all terminals 34 and data carrying devices 31 may be maintained. If terminals 34 send batch data to the host 33 on a daily basis, then the records kept on the host should be current for all transactions carried out
5   up to, and including, the preceding day.

The system 30 of the preferred embodiment is designed to work in conjunction with many of the pre-existing -card and terminal systems. Hence, the system 30 must run on many different terminals 34, often having different operating systems 41. For this reason, the software 40 in each of the terminals 34 includes at least one of the aforesaid
10   many possible operating systems 41, an application module 40 common to all terminals 34 in the system 30 and a hardware abstraction layer 42 being adapted to integrate said operating system 41 and said application module 40. This structure is shown schematically in Figure 4. In this manner, the core application module 40 can be copied in a substantially identical form to all terminals 34, each of which also include a
15   hardware abstraction layer 42 specifically tailored to integrate the application module 40 with the particular operating system 41 of the terminal 34. This arrangement advantageously allows the software 40 to be readily implemented upon many differing types of pre-existing terminal 34 in an efficient manner.

The application module 40 common to all terminals 34 includes the full variety
20   of applications supported by the system. Some or all of the applications are dormant until such time as a parameter file is received by the terminal 34 from the host 33 so as to initiate and subsequently modify applications and/or programmes as desired. As presently contemplated, the preferred embodiment includes the following applications:

Terminal Management 43;

Device Management 44;

Electronic Purse and other payment systems 45;

Loyalty and Incentive Programs 46;

5   Electronic Tickets 47;

Memberships and 48;

Access Control and Authentication 49.

The terminal management application 43 provides a means whereby field service technicians can manipulate various operating parameters, for example:

10   a merchant identification number;

a terminal identification number;

a host phone number and associated parameters.

The terminal management application 43 also provides for data storage means adapted to record details of all interactions between the terminal 34 and the data carrying devices

15   31, said details being stored in a current transaction log file. The terminals 34 further include means for batch communication of data stored in the data storage means to said host 33. The use of batch communication is preferable to communicating with the host 33 during every interaction between a terminal 34 and a data carrying device 31 because the interactions can thereby proceed far more swiftly. Additionally, the use of batch

20   processing reduces the overall communication costs. In the preferred embodiment, the terminals 34 communicate with the host 33 on a daily basis in a process referred to as "settlement". The settling process involves the terminal dialling a preset phone number and entering into a communications dialogue with the host. Once authenticated, the

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terminal uploads its current transaction log file and downloads a new parameter file, if
necessary. The terminal management application 43 will preferably provide means
whereby the settlement process is automatically initiated by the terminal 34 at a
predetermined time each day.

5   The card management application 44 checks every card that is presented to a
terminal and will activate other applications or programmes only when the card
management application 44 determines that the data carrying device 31 presented to the
terminal 34 contains a legitimate file structure, that is, a file structure having a static area
2, index area 3 and application area 4 as described above. The card management
10   application 44 will determine a card group into which the data carrying device 31 falls.
The card groups may be differentiated based upon criteria such as: country code; issuer
ID; physical appearance, target market for the device and device group. The card group
can be used to determine the rules of transaction between the terminal 34 and the device
31. The preferred embodiment of the present invention can advantageously interact with
15   devices 31 falling within different card groups and terminal groups. Additionally, the
rules which define the transactions between the terminal 34 and a given card group can
be readily altered by exchanging parameter files between the host 33 and the terminal 34.
In some embodiments, the rules of transaction relating to a given card group or a given
programme are written within programmes stored on the data carrying device 31.

20   The card management application 44 also controls the expiry and renewal of the
data carrying device 31 based upon parameters received from the host 33 on a card group
basis. Another parameter received from the host 33 defines a reminder period for
renewals, for example one month. In this case, device renewal may occur only during

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the reminder period, being the calendar month leading up to the expiry date. During the reminder period the device holder is notified of impending device expiry by messages that are included at the bottom of transaction receipts. The card management application 44 keeps track of a status of the device 31, for example either "initialised", "issued" or

5 "blocked". The host 33 maintains a list of blocked devices 31 that it sends to terminals 34, by means of parameter files, on a regular basis. When a terminal 34 encounters a device 31 that is included on the blocked list, the terminal 34 changes the status of the device 31 to "blocked".

The electronic purse application 45 is responsible for reading and writing

10 electronic representations of money to and from the data carrying devices 31 during transactions.

The loyalty programme application 46 is responsible for reading and writing loyalty points to and from the data carrying device 31. This application implements rules whereby loyalty points accumulate on the basis of predefined activities, such as

15 purchase amounts, purchase frequencies, data carrying device renewal etc. Such points can be implemented in schemes by merchants whereby accumulation of points beyond a predetermined threshold results in some reward for the device holder such as a gift or discount.

The electronic ticket application 47 allows the data carrying devices 31 to

20 support ticket functionality. For example, tickets to use a bus service could be purchased from a terminal owned by a retail merchant, with the necessary ticket data being written to the data carrying device 31. Terminals 34 are provided at entry or exit points to the

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bus service and the ticket data on the device 31 is updated as necessary as the device 31 passes through the terminals 34.

The membership application 48 and access control application 49 are functionally similar to the electronic ticket application 47.

5   As shown best in figure 5, the improved system 70 for manipulating data on a plurality of data carrying devices 71 includes at least one host 72 and a plurality of terminals 73. Each terminal is adapted to interact with the data carrying devices 71 and to communicate with said host 72. A first sub-set of the terminals are point of sale terminals 74 which each operate in the manner described with reference to figure 3. A

10   second sub-set of the terminals 73 are computing means 75 capable of interfacing to the internet for communication with an internet server 77, which, in turn, is connected for communication with the host 72.

This arrangement allows a user to conduct transactions with a single data carrying device 71 via either one of the POS terminals 74 or an internet server 77.

15   As best shown in figure 6, the computing means 75 may be in the form of a personal computer 76 having a modem (not illustrated) allowing for connection to the internet server 77. The personal computer 76 is adapted to read from, and write to, the data carrying devices 71. This may be achieved in a variety of manners, for example, some embodiments of the personal computers 76 are provided with in-built card reading

20   and writing apparatus (not illustrated), in particular the keyboards (not illustrated) of some newer personal computers 76 include in-built smart card readers/writers. Older style personal computers 76 which do not include such in-built apparatus may have separate card reading and writing apparatus plugged into a port (not illustrated), for

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example a serial port. Alternatively, a smart card reader/writer plug-in module such as the SmartDisk Smarty reader (not illustrated), may be used to allow a 3.5 inch floppy drive to function as a smart card reader/writer.

Any other computing means 75 having the capacity to communicate digital
5   information via an internet server 77, for example, electronic information kiosks 78 or personal digital assistants 79 such as palmtop and handheld computers, can be used in the preferred embodiment as an interface to the internet.

As explained above, the standard (non-internet capable) system 30 illustrated in figure 3 includes a number of POS terminals 34, each of which include terminal software
10   which is activatable and configurable in response to parameter files which pass between the host 33 and the terminals 34. In the internet-capable system 70 of the present invention, the POS terminals operate in this standard fashion. However, in the sub-set of terminals 75 which are adapted to communicate with the host 72 via an internet server 77, the "terminal" software resides on the internet server. Hence the parameter files (not
15   illustrated) which define the various programmes that are available at each terminal 74 or internet server 77 are initiated at the host 72 and downloaded to the POS terminals 74 and the internet servers 77. Additionally, details of all transactions are uploaded from the POS terminals 74 and the internet servers 77 to the host 72 on a daily basis.

To help address concerns regarding the security of information conveyed upon
20   the internet, the system 70 of the present invention may include an electronic signature application stored upon the data carrying devices 71 which can be used for identity verification.

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In the preferred embodiment, each data carrying device has a memory space 1 as described above with reference to figures 1 and 2 having a static area 2, an index area 3 and an application area 4. Additionally, each data carrying device preferably has one or more programs associated with the following applications: an electronic purse or other

5   payment system; loyalty; electronic tickets; memberships; and/or access control.

A typical POS transaction involving a loyalty reward using the system 70 of the present invention with a data carrying device having payment system and loyalty programs would proceed as follows:

- a consumer decides to make a purchase at a retail outlet;

10   • the data carrying device 71 is offered to the merchant and placed into a POS terminal 74;

- the appropriate deduction is made from the payment mechanism;

- the loyalty programme on the data carrying device 71 is updated as necessary; and

- the details of the transaction are logged for later communicated to the host.

15   In contrast, a typical internet transaction involving a payment and a loyalty reward using the preferred method of the present invention on a data carrying device having both a payment system program and a loyalty program would proceed as follows:

- the consumer places a data carrying device 71 into the reader/writer of their computing means;

20   • the consumer selects the merchant's internet site, for example a home page, using computing means 75 such as a personal computer 76, kiosk 78 or personal digital assistant 79;

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- if the computing means 75 does not already have transaction enabling software, the consumer is given the opportunity to download the software across the internet, the software may then be stored on the computing means 75. At subsequent occasions, the consumer can select the transaction enabling software which was previously

5   stored on their computing means 75;

- the consumer uses the computing means 75 to select the item or service which they wish to purchase;

- in some embodiments the digital signature on the data carrying device 71 provides secure identification of the consumer;

10 - terminal software installed upon the internet server 77 checks whether the payment program has an amount of electronic representation of money required for the proposed transaction and whether a loyalty reward is due in return for the proposed transaction and

- updated data is written to the data carrying device 71 as appropriate for the

15   transaction, for example the required amount of money is deducted from the payment system program to pay for the good or service and/or a loyalty reward is written onto the loyalty programme of the data carrying device 71.

The data in the loyalty reward program and the payment system program is therefore immediately updated in the data carrying device after the above transaction.

20 Hence, if sufficient loyalty points are accrued, a loyalty reward may be immediately available to the consumer which could then be redeemed regardless of whether the next transaction is made via a POS terminal 74 or another internet purchase.

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It will be appreciated by those skilled in the art that the term "transaction", as used in this specification, is not limited to "financial transactions" (in the sense that money, or an electronic representation thereof, is exchanged). For example, a user with sufficient loyalty points accumulated on their data carrying device 71 may use their
5   computing means 75 to order their loyalty reward over the internet, without any currency changing hands.

The preferred embodiment allows a consumer to use computing means 75 to access an enquiry server on the internet. This enables consumers to read sufficient information from their data carrying device 71 to determine the current status of at least
10   some of the various programmes on the device. For example, a consumer may use the preferred embodiment to determine how much money is held in electronic purse programmes, how many tickets remain in electronic ticketing programmes, what entitlements they have accrued in loyalty programmes or what memberships are held on the device 71.

15   This versatility allows the preferred embodiment 70 to provide a highly accessible and convenient system on which a consumer can trade seamlessly with a business via either a point of sale terminal or the internet. For example, the system of the present invention allows a consumer to make the following types of transactions, in quick succession if necessary:

20   • purchase a book in a bookshop, using the electronic purse application of the preferred embodiment in the point of sale terminal 74 at the shop, have a loyalty reward consisting of a discount applicable to the next purchase written to the data carrying

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device 71, then buy a book over the internet with the benefit of a discount due to the

loyalty reward;

- purchase a monthly train ticket at a train station, and then renew the ticket over the

  internet; and

5 - reload a pre-paid telephone card over the internet, and receive a one-week health club

  membership as a cross-promotional loyalty reward.

The information carried on the data carrying device 71 eliminates the

requirement of the prior art for the trader's separate systems to be accessed and

reconciled before the most recent status can be identified and the appropriate action

10 taken. Advantageously, the information stored in the host 72, which is privy to

transactions carried out on both the POS terminals 74, and via the internet, provides the

merchant with a single point of management. This allows the merchant to manage and

analyse both internet and POS transactions in an integrated fashion.

Although the invention has been described with reference to specific examples, it

15 will be appreciated by those skilled in the art that the invention may be embodied in

many other forms.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1.   A system for manipulating data on a plurality of data carrying devices, said system including at least one host and a plurality of terminals, each terminal being adapted to interact with said data carrying devices and to communicate with said host, wherein a first sub-set of said terminals are point of sale terminals and a second sub-set of said terminals are computing means capable of interfacing to the internet for communication with an internet server which in turn is connected for communication with said host, said computing means being adapted to read from, and write to, said data carrying devices.

2.   A system for manipulating data on a plurality of data carrying devices according to claim 1 wherein the computing means are in the form of any one or more of the following: personal computers; personal digital assistants; mobile phones; or electronic information kiosks.

3.   A method for manipulating data on a plurality of data carrying devices according to claim 1 or 2 wherein terminal software is installed upon said internet server, said terminal software being activatable and configurable in response to parameter files sent from the host.

4.   A system for manipulating data on a plurality of data carrying devices according to claim 3 wherein said terminal software includes enquiry software to enable a user to obtain from their computing means information indicative of a state of their data carrying device.

5.   A system for manipulating data on a plurality of data carrying devices according to claim 4 wherein said information is indicative of any combination of the following:

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an amount of money associated with an electronic purse programme; an amount of

loyalty credit associated with a loyalty programme; tickets held in a ticketing

programme; or memberships held in a membership programme.

6.   A system for manipulating data on a plurality of data carrying devices according

to any one of the above claims wherein the data carrying devices include an electronic

signature which can be used to verify the identity of a device owner.

7.   A method for manipulating data on data a carrying device which includes

combinations of any one or more programs for the following applications: an electronic

purse or other payment system; loyalty; electronic tickets; memberships; and/or access

control, said method including the steps of:

     a)   inserting a data carrying device into a computing means adapted to read

        from, and write to, said data carrying devices, said computing means being

        adapted to interface to the internet for communication with an internet server

        which, in turn, is connected for communication with a host;

     b)   using said computing means to establish a connection with a

        merchant internet site;

     c)   if transaction enabling software is not already stored on the computing

means, downloading said software across the internet;

     d)   using said computing means to select a good or service offered by said

merchant; and

     e)   using said computing means to write updated data to at least one of said

programs as appropriate for said transaction.

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8.   A method for manipulating data on a plurality of data carrying devices according to claim 7 wherein terminal software is installed upon said internet server , said terminal software being activatable and configurable in response to parameter files sent from the host.

9.   A method for manipulating data on a plurality of data carrying devices according to claim 8, when used with data carrying devices having loyalty programs, wherein step e) includes the following sub-steps:

    e1)   using said terminal software installed upon said internet server to check whether a loyalty reward is due in return for purchase of said good or service;

    e2)   updating loyalty data in a loyalty programme on said data carrying device if a loyalty reward is due.

10.   A method for manipulating data on a plurality of data carrying devices according to any one of claims 7 to 9, further including the step of:

accessing an electronic signature from the data carrying device prior to performing step d) so as to verify the identity of a device owner.

11.   A system for manipulating data on a plurality of data carry devices substantially as herein described with reference to figures 5 and 6.

12.   A method for manipulating data on a plurality of data carrying devices substantially as herein described with reference to figures 5 and 6.

Figure 1

Schematic view of chip memory space

Static area — 2

Index area — 3

Application area — 4
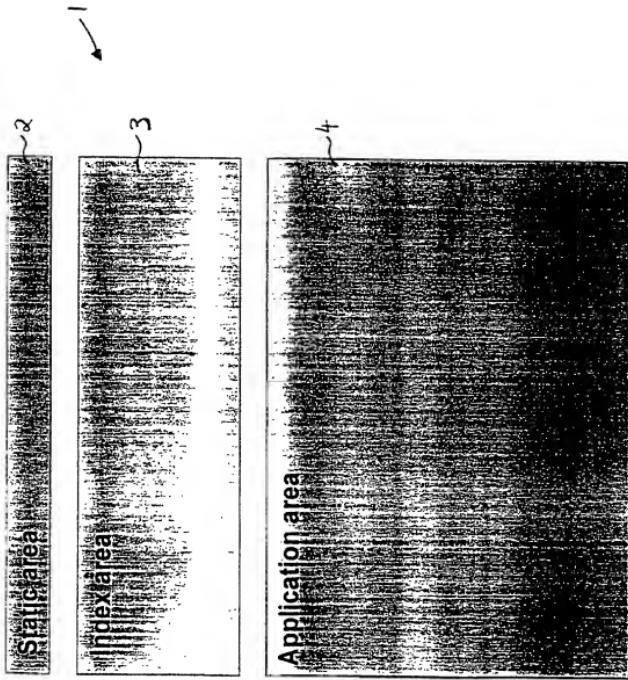
Preferred usage of memory space

Figure 2

48 bytes

n x 2 bytes

Static area defines the value of n where n = the maximum number of applications stored in the memory space

n x 16 bytes

Static area

Index area

AID_4 AID_5 AID_6 AID_n

Application area

Application data$_4$

Application data$_5$

Application data$_6$

Application data$_n$

Static area contains pointers to the start of the index and application areas

Each entry in the index area defines the contents of the corresponding application block in the application area via the use of predetermined application IDs (AIDs).

Schematic diagram of a sample system

Multiple host systems supporting different groups of terminals

Multiple terminals and terminal types

Multiple cards and card types accepted in multiple terminals and terminal types
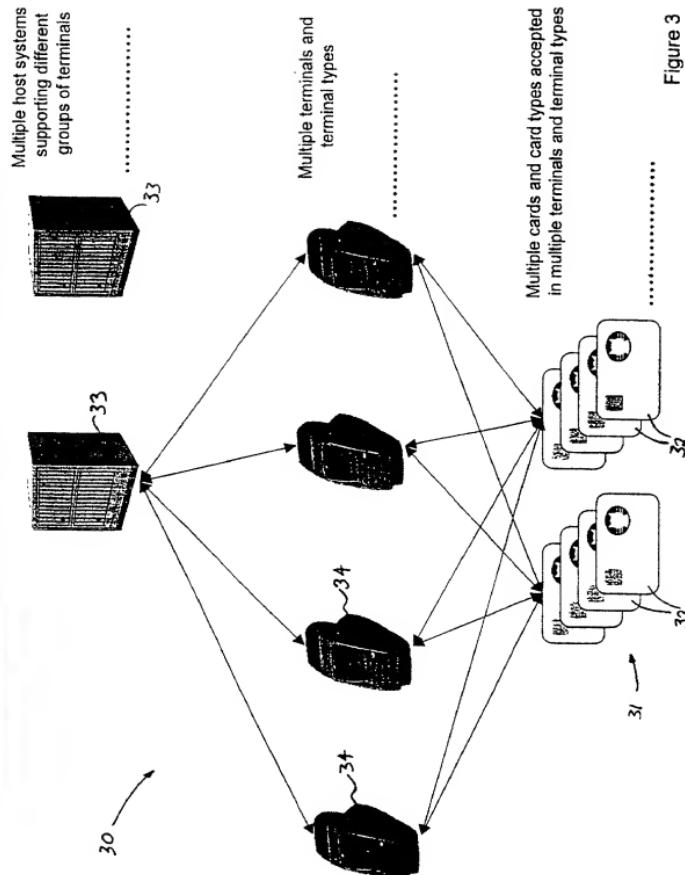
Figure 3

Schematic diagram of terminal software
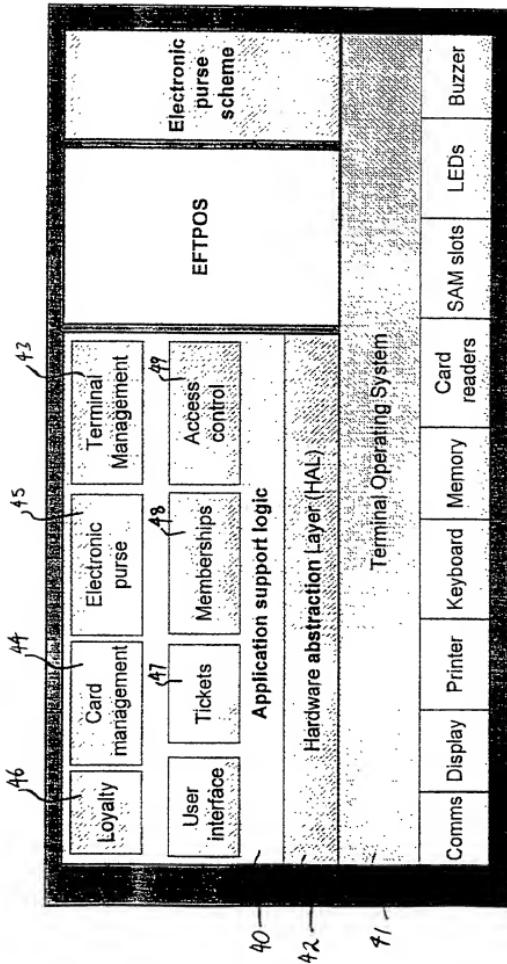
Figure 4
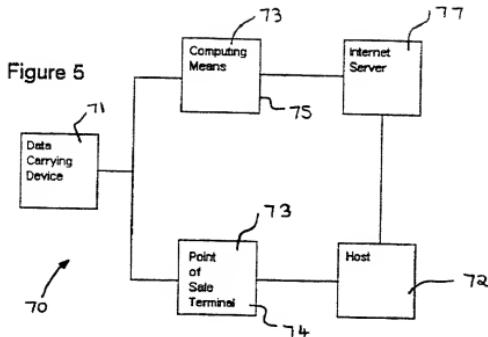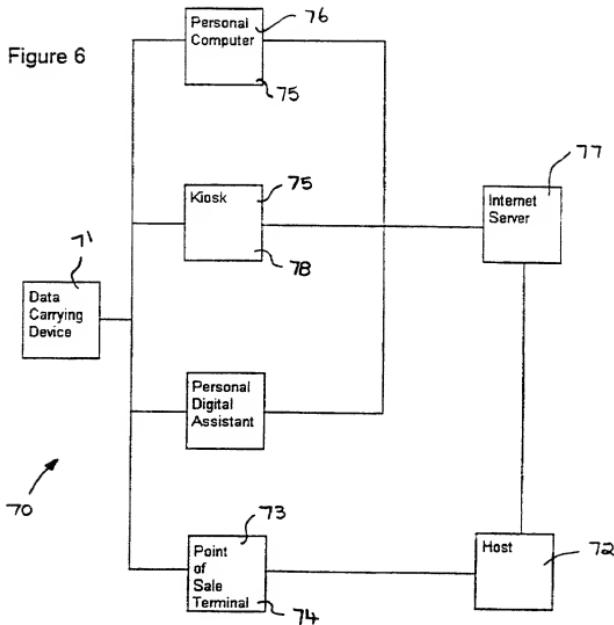
Loyalty — 46

Card management — 44

Electronic purse — 45

Terminal Management — 43

Access control — 49

User interface

Tickets — 47

Memberships — 48

Application support logic — 40

EFTPOS

Electronic purse scheme

Hardware abstraction Layer (HAL) — 42

Terminal Operating System — 41

Comms | Display | Printer | Keyboard | Memory | Card readers | SAM slots | LEDs | Buzzer

Figure 5

- 73 Computing Means
- 77 Internet Server
- 75
- 71 Data Carrying Device
- 70
- 73 Point of Sale Terminal
- 74
- Host
- 72

Figure 6

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☐ Declaration Submitted With Initial Filing

OR

☒ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	4726-000003
First Named Inventor	David L. Mac.Smith
COMPLETE IF KNOWN	
Application Number	09/914,225
Filing Date	
Group Art Unit	
Examiner Name	

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

> INTEGRATED POINT-OF-SALE AND INTERNET MULTI-APPLICATION SYSTEM AND METHOD OF USE THEREOF

the specification of which   *(Title of the Invention)*

☐   is attached hereto

OR

☒   was filed on (MM/DD/YYYY)   **02/22/2000**   as United States Application Number or PCT International

Application Number   **PCT/AUOO/00121**   and was amended on (MM/DD/YYYY) [   ] (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or of any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY) Country	Priority Not Claimed	Certified Copy Attached? YES	NO
PP8801	Australia	02/22/99	☐	☐	☒
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

[Page 1 of 2]

DECLARATION — Utility or Design Patent Application

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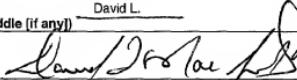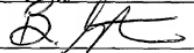
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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☒ Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.

[Page 2 of 2]

Please type a plus sign (+) inside this box ⟶ | + |

DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet
Page 1 of 1

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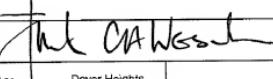
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